Electronic Version
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Claims

[c1] What is claimed is:

1. A method of MR imaging comprising:

acquiring k-space data for less than all of k-space from a subject;

reconstructing the k-space data into image data having a first resolution;

transforming the image data into k-space data; and

processing the transformed k-space data into image data having a second resolution, the first resolution being different from the second resolution.

[c2] 2. The method of claim 1 wherein the step of transforming includes applying one of a Fast Fourier Transform (FFT) and a Radon transformation to the image data.

[c3] 3. The method of claim 1 wherein the step of processing includes applying a partial Fourier transformation to the transformed k-space data.

[c4] 4. The method of claim 3 wherein the partial Fourier transformation includes one of homodyne processing and POCS processing the transformed k-space data.

[c5] 5. The method of claim 1 wherein the second resolution exceeds the first resolution.

[c6] 6. The method of claim 1 further comprising the step of acquiring the k-space data from a subject being translated through an imaging volume.

[c7] 7. The method of claim 1 wherein the step of reconstructing includes the step of replacing unacquired portions of k-space with zero-value data.

[c8] 8. The method of claim 1 wherein the step of reconstructing includes the step of carrying out a moving table reconstruction of the k-space data.

[c9] 9. The method of claim 1 wherein the step of reconstructing includes correcting for gradient non-uniformities.

10. The method of claim 9 configured to utilize Hermitian symmetry after the k-space is acquired and corrected.

[c10] 11. The method of claim 9 configured to utilize Hermitian symmetry to improve resolution of an image generated from a less than all k-space data acquisition.

[c11] 12. An MRI apparatus comprising:

a magnetic resonance imaging (MRI) system having a

plurality of gradient coils positioned about a bore of a magnet to impress a polarizing magnetic field and an RF transceiver system and an RF switch controlled by a pulse module to transmit RF signals to an RF coil assembly to acquire MR images; and

a computer programmed to execute an image generation technique that utilizes Hermitian symmetry in the reconstruction of an image from MR data after the MR data has been corrected for non-uniformities.

[c12] 13. The MRI apparatus of claim 12 further comprising a table configured to translate a patient through an imaging volume during data acquisition.

[c13] 14. The MRI apparatus of claim 13 wherein the table is further configured to continuously translate the patient through the imaging volume during data acquisition.

[c14] 15. The MRI apparatus of claim 12 wherein the image generation technique causes the computer to:

acquire MR data of a patient;

correct geometric distortions in the MR data;

reconstruct the MR data to image data;

transform the image data back to k-space data; and

process the k-space data to generate image data with enhanced resolution.

[c15] 16. The MRI apparatus of claim 15 wherein the computer is programmed to transform the image data by applying one of an FFT and a Radon reconstruction to the image data.

[c16] 17. The MRI apparatus of claim 15 wherein the computer is programmed to process the k-space data by applying a partial Fourier reconstruction to the k-space data.

[c17] 18. The MRI apparatus of claim 17 wherein the partial Fourier reconstruction includes homodyne reconstruction of the k-space data.

[c18] 19. A computer readable storage medium having stored thereon a computer program representing a set of instructions that when executed by a computer causes the computer to:
transform a first image space dataset into a k-space dataset;
partial Fourier reconstruct the k-space dataset into a second image space dataset; and
generate an image from the second image space dataset.

[c19] 20. The computer readable storage medium of claim 19 wherein the set of instructions further causes the computer to acquire an MR dataset from a moving object and reconstruct the MR dataset into the first image space

dataset.

[c20] 21. The computer readable storage medium of claim 20 wherein the set of instructions further causes the computer to correct gradient non-uniformities in the acquired MR dataset.

[c21] 22. The computer readable storage medium of claim 21 wherein the set of instructions further causes the computer to zero-pad the MR dataset to have a desired dimension.

[c22] 23. The computer readable storage medium of claim 19 wherein the set of instructions further causes the computer to transform the first image space dataset with an FFT.

[c23] 24. The computer readable storage medium of claim 19 wherein the image has a resolution that would exceed that of an image generated from the first image space dataset.

[c24] 25. The computer readable storage medium of claim 19 wherein the set of instructions further causes the computer to apply one of a homodyne reconstruction and a POCS reconstruction to partial Fourier reconstruct the k-space dataset.